

# PeerScout: Diversifying peer review with data and machine learning

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csv,conf,v5



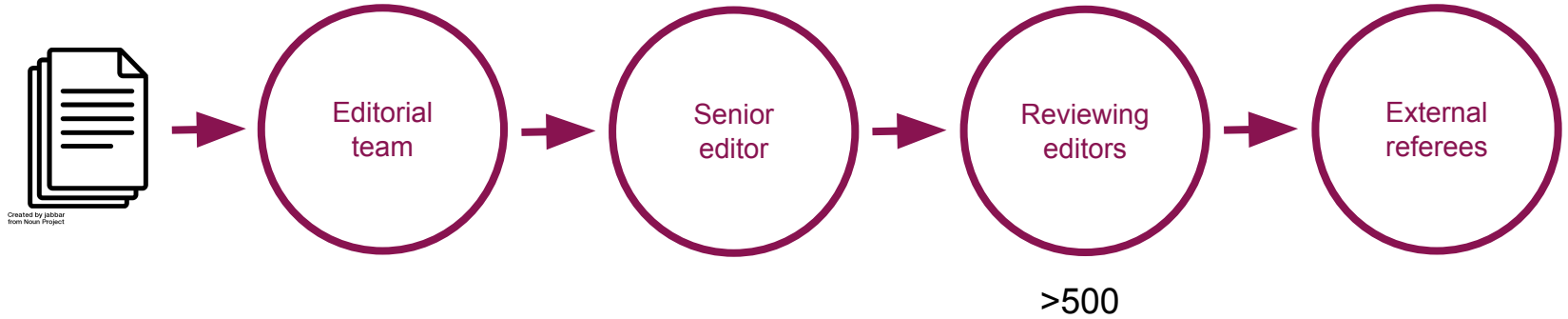
Helping scientists **accelerate discovery** by  
operating a platform for research **communication**  
that encourages and recognises **the most**  
**responsible behaviours in science.**

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# The science publishing process



## Finding the right editors and referees for a manuscript



“We found a homophilic interaction between the demographics of the gatekeepers and authors in determining the outcome of peer review; **that is, gatekeepers favor manuscripts from authors of the same gender and from the same country.**”

– Murray et al., 2019

Murray, D., Siler, K., Larivière, V., Chan, W. M., Collings, A. M., Raymond, J., & Sugimoto, C. R. (2019). Gender and international diversity improves equity in peer review. *BioRxiv*, 400515.

Also see [Early-career Reviewers: Reflections on focused inclusion in reviews at eLife](#)

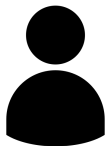


## PeerScout v1: Workflow



Created by jabbar  
from Noun Project

Topic modelling



Created by mikicon  
from Noun Project

Build profile based on  
papers handled

Calculate score  
based on how much  
these profiles match

Ranked list for users  
to choose from



## PeerScout v1: Suggested reviewers



**Review Time:** Overall: 5.4 days (avg over 4 reviews), 0 reviews in progress, 0 reviews awaiting response, 0 reviews declined  
Last 12 months: n/a

**Scores:** **100** (max across manuscripts)

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(early career reviewer) [ORCID](#) [Crossref](#)

**Review Time:** Overall: 6.6 days (avg over 3 reviews), 0 reviews in progress, 0 reviews awaiting response, 1 review declined  
Last 12 months: 7.3 days (avg over 2 reviews), 0 reviews in progress, 0 reviews awaiting response, 1 review declined

**Author of:**

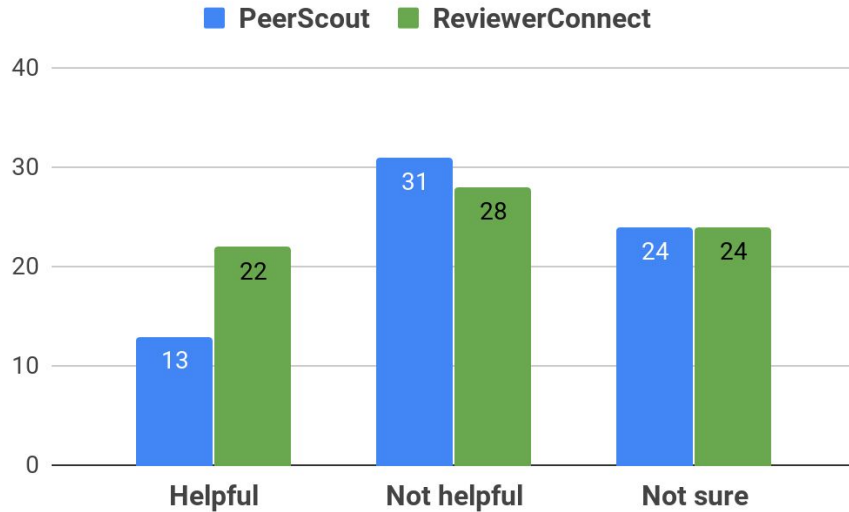


**Scores:** **58** (max across manuscripts)



## PeerScout v1: User feedback

User feedback



“I don’t know / have never heard of this person.”

“Wrong area of expertise.”

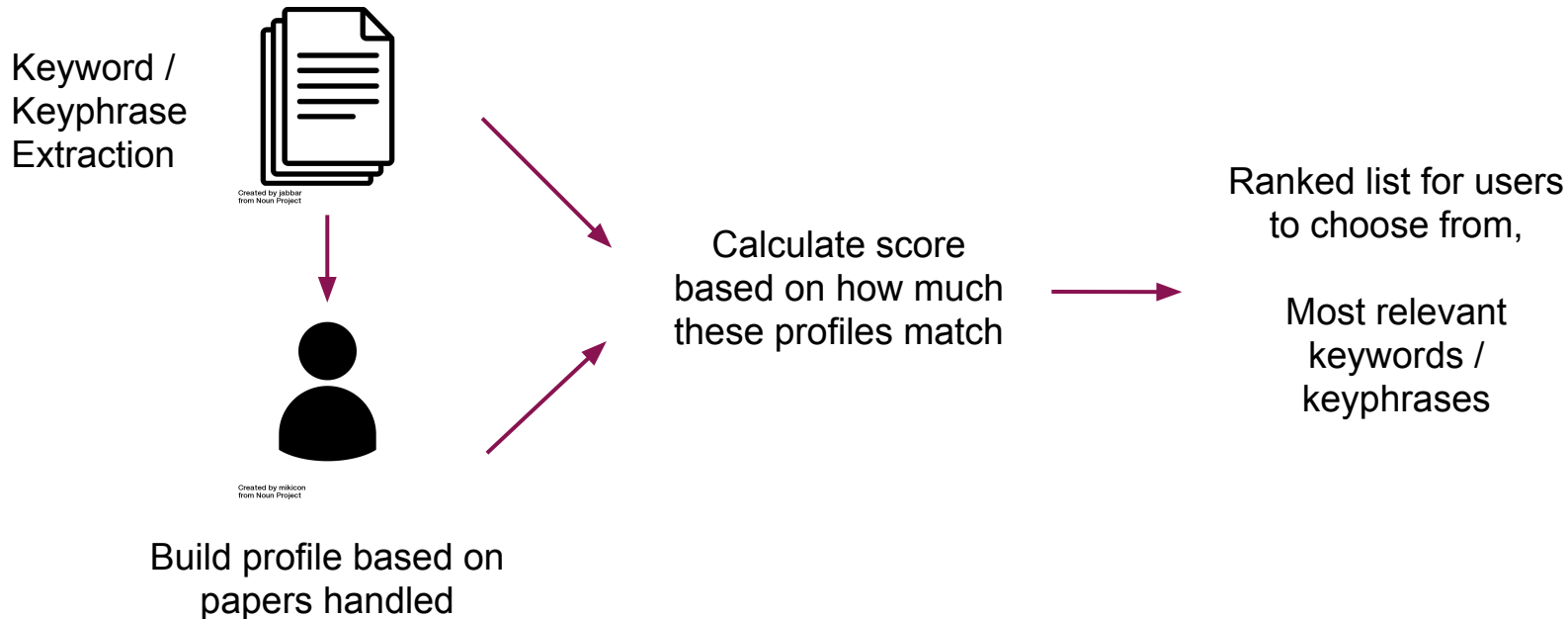
## Lessons learnt from PeerScout v1

We were trying to kill too many birds with one stone: getting editors to use and trust this new AI tool, adding early career researchers (ECRs) to the reviewing process

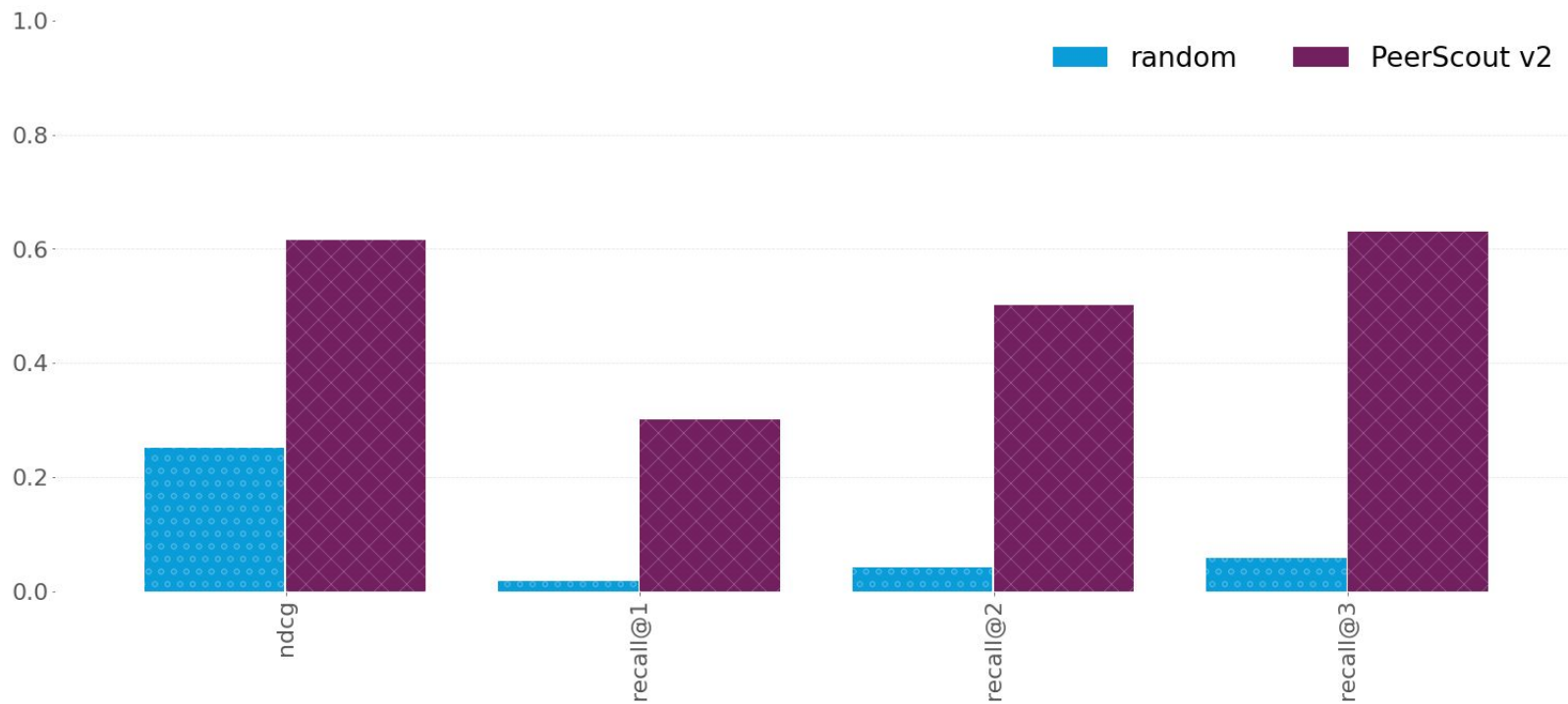
With v2, we need to:

- Find a way to benchmark the performance of PeerScout, on a technical level
- Improve UI and information displayed to gain editors' trust
- Add ECR information and recommendations into the tool but in a way that does not interfere with the above two goals

## PeerScout v2: Workflow



## PeerScout v2: Evaluation



# PeerScout v2: User interface

Manuscript:  (1) ▾

Filter by subject areas:  ▾ AND  ▾

Filter by keywords:  ▾ AND  ▾

Abstract	Latest Stage
[Blurred abstract text]	[Blurred latest stage text]

Name	Availability	Subject Areas	Keywords	Research Organisms	Research Interests	Website	Matching Keywords
[Blurred name]	[Blurred availability]	Neuroscience, Human Biology and Medicine	synaptic transmission, synaptic plasticity, ligand-gated ion channels, hippocampus, olfactory bulb, epilepsy, in vitro physiology, activity-dependent gene expression	Mouse	[Blurred research interests]	[Blurred website]	synapsis, synaptic, neuron, presynaptic, spine, brain, mouse, dendritic, dendritic spine, synaptic remodeling, active, transgenic, transgenic mouse, filopodia, microglia, fluorescent, healthy, elevated, label, target, duration, process, result, generation, turnover, mature, contact, head
[Blurred name]	[Blurred availability]	Immunology and Inflammation	innate immunity, response to cell death, macrophage biology	Human, Mouse	[Blurred research interests]	[Blurred website]	dendritic, mouse, result

## What we have learnt

- AI/machine learning/big data solutions serve little value if they are not designed to meet user needs
- Working closely with users (our editorial community) allows us to respond and make changes to address their concerns – their support is crucial in this process
- Tackle problems one-by-one to better prioritise and measure performance

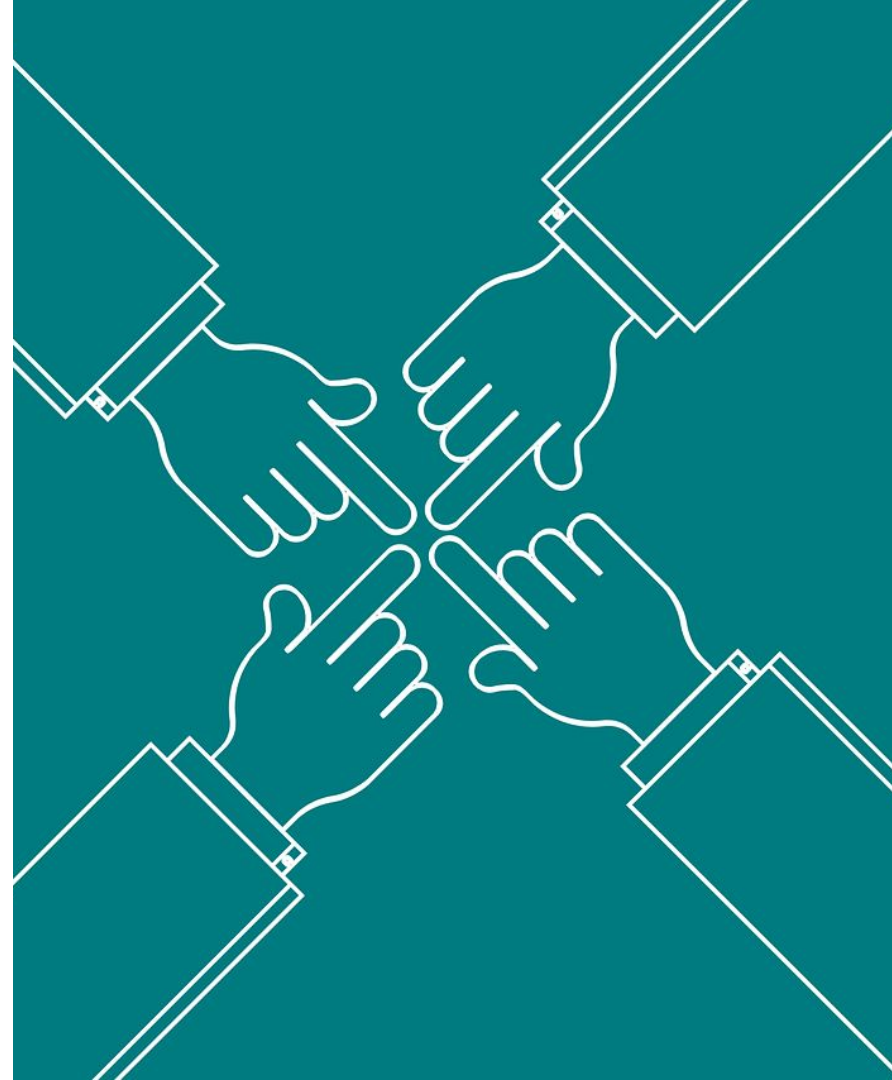
@eLifeInnovation



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## In the future

- Explore **concept extraction** from papers
- **Expand recommendations** to not only past reviewers and ECR lists, but the wider scientific community
- Explore **alternative data sources** to build profiles, e.g. authored papers
- Turn this around: editors to see a list of recommended papers that they can potentially handle?



# Thank you!

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# Supplementary information

# Editor Search



Senior Editor search

[Assignments and times](#)

[Consultations](#)

Filter by Name

[Help](#)

Filter by subject areas:

Subject Area 1

AND

Subject Area 2

Filter by keywords:

Keyword 1

AND

Keyword 2

Name	Availability	Subject Areas	Keywords	Research Organisms	Research Interests	Website	PubMed profile	Most relevant PubMed publications
[Redacted]	[Redacted]	Computational and Systems Biology, Physics of Living Systems	systems biology, gene regulatory networks, immune system, population genetics	Zebrafish	[Redacted]	[Redacted]	<a href="#">PubMed</a>	<a href="#">1</a> <a href="#">2</a> <a href="#">3</a> <a href="#">4</a> <a href="#">5</a>
[Redacted]	[Redacted]	Neuroscience	auditory processing, auditory perception, multisensory integration, sensory coding, adaptation, perceptual learning, in vivo physiology, neuroanatomy, psychophysics	Human, Mouse	[Redacted]	[Redacted]	<a href="#">PubMed</a>	<a href="#">1</a> <a href="#">2</a> <a href="#">3</a> <a href="#">4</a> <a href="#">5</a>
[Redacted]	[Redacted]	Cell Biology	cytoskeletal dynamics, microtubule-binding proteins, microtubule-based motors	Human, Mouse	[Redacted]	[Redacted]	<a href="#">PubMed</a>	<a href="#">1</a> <a href="#">2</a> <a href="#">3</a> <a href="#">4</a> <a href="#">5</a>

# ECR Reviewer Search



Early-Career Reviewer search

Filter by ECR Name

Filter by Nominating/Relevant Editor

[Help](#)

Filter by subject areas:

Subject Area 1

AND

Subject Area 2

Filter by keywords:

Keyword 1

AND

Keyword 2

Name	Institution	Country	Keywords	Nomination Note	Email	Webpage	CV	Last review date	Total number of reviews	Average review duration	Number of times rated as outstanding
[Redacted]	[Redacted]	[Redacted]	microbial ecology, metagenomics	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]
[Redacted]	[Redacted]	[Redacted]	evolution, ecological genomics, adaptation, speciation, hybridization	[Redacted]	[Redacted]	[Redacted]	<a href="#">View CV</a>	[Redacted]	[Redacted]	[Redacted]	[Redacted]
[Redacted]	[Redacted]	[Redacted]	collagen, basement membrane, evolution, non-bilaterian, extracellular matrix, animal phylogenetics	[Redacted]	[Redacted]	[Redacted]	<a href="#">View CV</a>	[Redacted]	[Redacted]	[Redacted]	[Redacted]
[Redacted]	[Redacted]	[Redacted]	humanization of yeast, functional complementation, orthology, [Redacted]	[Redacted]	[Redacted]	[Redacted]	<a href="#">View CV</a>	May 1, 2019	1	16	0